

**Toshkent davlat iqtisodiyot universiteti Samarqand filiali 1-bosqich
60410200-Buxgalteriya hisobi (KPT/JPS (FA 2653) 08/23 - Buxgalteriya
hisobida biznesni boshqarish)-2025 (qo'shma dastur) talabalari uchun
“Amaliy matematika 2” fanidan nazorat savollari**

Ishchi mavzu (auditoriya dars mavzulari) yuzasidan savollar:

1. Aniq integral va uning xossalari (aniq integral, aniq integralning xossalari)
2. Aniq integralning geometrik manosi (*Aniq integralning geometrik manosi*)
3. Aniq integralda o'zgaruvchilarni almashtirib hisoblash (*o'zgaruvchilarni almashtirib integrallash*)
4. Integral hisobning asosiy teoremasi (*Integral hisobning asosiy teoremasi, Nyuton-Leybnits teoremasi*)
5. Aniq integralni bo'laklab integrallash (*bo'laklab integrallash, teorema*)
6. Birinchi tur xosmas integrallar (*xosmas integrallar, Birinchi tur xosmas integrallar, teorema*)
7. Ikkinchi tur xosmas integrallar (*Ikkinchi tur xosmas integrallar xaqidagi teorema*)
8. Ikkinchi tur xosmas integrallarning yaqinlashish alomati (*ikkinchi tur xosmas integrallar, teoremlar*)
9. Qatorlarni yaqinlashishga tekshirishda taqqoslash alomati (*taqqoslash alomati, teorema*)
10. Qatorlarni yaqinlashishga tekshirishda D'alamber alomati (*D'alamber alomati*)
11. Uzoqlashuvchi sonli qatorlar (*Uzoqlashuvchi sonli qatorlar*)
12. Qatorlarni yaqinlashishga tekshirishda Koshining ildiz alomati (*Koshining ildiz alomati*)
13. Qatorlarni yaqinlashishga tekshirishda Koshining integral alomati (*sonli qatorlar, Koshining integral alomati*)
14. Darajali qatorlar va ularning yaqinlashishi (Darajali qaror ta'rifi, yaqinlashish radiusi va sohasi)

- 15.Funksional qatorlarni yaqinlashishga tekshirishda Abel teoremasi (*yaqinlashish radiusi, yaqinlashish sohasi*)
- 16.Differensial tenglamalar deb nimaga aytiladi (*differensial tenglamalar, birinchi, ikkinchi tartibli differensial tenglamalar*)
- 17.O'zgaruvchilari ajraladigan differensial tenglamalar (*O'zgaruvchilari ajraladigan differensial tenglamalar*)
- 18.Birinchi tartibli chiziqli differensial tenglama va uning yechimini topish formulasi.
- 19.Bernulli tenglamasi va uni yechish.
- 20.To'liq differensialli tenglama va uni yechish.
- 21.Hosilaga nisbatan yechilgan bir jinsli differensial tenglamalar va ularni yechish
- 22.Kombinatorika elementlari (*o'rinlashtirish, o'rin almashtirish, guruhlash*)
- 23.Ehtimollar nazariyasi fanining predmeti, maqsad va vazifalari (*predmeti, maqsadi, vazifalari*)
- 24.Tasodifiy hodisalar va ular ustida amallar (*hodisalar va ular ustida amallar*)
- 25.Hodisalarning erkliligi va eng sodda formulalari (*shartli ehtimol, to'la ehtimol, Bayes formulasi*)
- 26.Ehtimolning statistik, klassik va geometrik ta'rifi
- 27.Hodisalar ustida amallar (*qo'shish, ko'paytirish, ayirish*)
- 28.Muavr-Laplasning lokal limit teoremasi (*Muavr-Laplasning lokal limit teoremasi*)
- 29.Muavr-Laplasning integral limit teoremasi (*Muavr-Laplasning integral limit teoremasi*)
- 30.Tasodifiy miqdorlarning dispersiyasi va uning xossalari (*tasodifiy miqdorlar, dispersiya va xossalari*)
- 31.Diskret tasodifiy miqdorlar (*diskret tasodifiy miqdorlar, taqsimot qonuni, xossalari, dispersiyasi, matematik kutilmasi*)
- 32.Tasodifiy miqdorlarning taqsimot funksiyasi va uning xossalari (*tasodifiy miqdorlar, taqsimot funksiya, xossalari*)
- 33.Tasodifiy miqdorlarning matematik kutilmasi (*tasodifiy miqdorlar, matematik kutilma, xossalar*)

34. Tasodifiy miqdorlarning o'rtacha kvadratik chetlanishi (*tasodifiy miqdorlar, matematik kutilma, dispersiya*)
35. Chebishev tengsizligi va teoremasi (*Chebishev tengsizligi va teoremasi*)
36. Matematik statistika elementlari (*empirik qonun, variatsion qator paligon va gistogramma*)
37. Taqsimotning empirik taqsimot funksiyasi (*taqsimot, empirik funksiya, empirik funksiya grafigi*)
38. Chiziqli regressiya tenglamasi.
39. Egri chiziqli regressiya tenglamasi.
40. Korrelyatsiya koeffitsiyenti va uning xossalari

Misollar:

Bu bo'limda Nyuton-Leybnits formulasini qo'llash va sodda xossalarga oid misollar jamlangan.

1. $\int_0^1 x dx$
2. $\int_1^2 2x dx$
3. $\int_0^3 x^2 dx$
4. $\int_{-1}^1 x^3 dx$
5. $\int_1^4 \sqrt{x} dx$
6. $\int_0^{\pi/2} \cos x dx$
7. $\int_0^{\pi} \sin x dx$
8. $\int_1^e \frac{1}{x} dx$
9. $\int_0^1 e^x dx$
10. $\int_0^2 (x+1) dx$

$$11. \int_1^3 (2x-1)dx$$

$$12. \int_0^1 (3x^2+1)dx$$

$$13. \int_{-2}^2 5dx$$

$$14. \int_0^1 \frac{1}{1+x^2} dx$$

$$15. \int_0^{1/2} \frac{1}{\sqrt{1-x^2}} dx$$

$$16. \int_1^2 \frac{dx}{x^2}$$

$$17. \int_0^{\pi/4} \frac{dx}{\cos^2 x}$$

$$18. \int_{\pi/4}^{\pi/2} \frac{dx}{\sin^2 x}$$

$$19. \int_0^1 (x^3-x)dx$$

$$20. \int_1^{e^2} \frac{1}{x} dx$$

$$21. \int_0^2 e^{x/2} dx$$

$$22. \int_{-1}^1 (1-x^2)dx$$

$$23. \int_0^{\pi} \sin(2x)dx$$

$$24. \int_1^4 \frac{1}{\sqrt{x}} dx$$

$$25. \int_0^1 \sqrt[3]{x} dx$$

$$26. \int_0^1 (2x+3)^2 dx$$

$$27. \int_0^{\pi/2} \cos(2x)dx$$

$$28. \int_1^2 (x^2-2x+1)dx$$

$$29. \int_{-\pi}^{\pi} \sin x dx$$

$$30. \int_0^1 e^{-x} dx$$

Cheksiz chegarali va maxsus nuqtali integrallarning yaqinlashishini tekshirish va hisoblash.

$$1. \int_1^{\infty} \frac{1}{x^2} dx$$

$$2. \int_1^{\infty} \frac{1}{x^3} dx$$

$$3. \int_1^{\infty} \frac{1}{\sqrt{x}} dx \text{ (uzoqlashuvchi)}$$

$$4. \int_0^{\infty} e^{-x} dx$$

$$5. \int_0^{\infty} e^{-2x} dx$$

$$6. \int_1^{\infty} \frac{dx}{x}$$

$$7. \int_{-\infty}^0 e^x dx$$

$$8. \int_0^1 \frac{dx}{\sqrt{x}}$$

$$9. \int_0^1 \frac{dx}{x}$$

$$10. \int_2^{\infty} \frac{dx}{x^2 - 1}$$

$$11. \int_0^{\infty} \frac{dx}{1 + x^2}$$

$$12. \int_1^{\infty} \frac{dx}{x^4}$$

$$13. \int_0^4 \frac{dx}{\sqrt{4-x}}$$

$$14. \int_1^{\infty} \frac{dx}{x^{1.1}}$$

$$15. \int_0^1 \frac{dx}{\sqrt[3]{x}}$$

$$16. \int_1^{\infty} \frac{dx}{x \ln x}$$

$$17. \int_e^{\infty} \frac{dx}{x \ln^2 x}$$

$$18. \int_{-\infty}^{\infty} \frac{dx}{1+x^2}$$

$$19. \int_0^{\infty} x e^{-x^2} dx$$

$$20. \int_1^{\infty} \frac{e^{-\sqrt{x}}}{\sqrt{x}} dx$$

$$21. \int_0^1 \ln x dx$$

$$22. \int_1^{\infty} \frac{2x dx}{(1+x^2)^2}$$

$$23. \int_0^{\pi/2} \tan x dx$$

$$24. \int_0^{\infty} \sin x dx$$

$$25. \int_2^{\infty} \frac{dx}{x \ln^3 x}$$

$$26. \int_0^1 \frac{dx}{x^2 + x}$$

$$27. \int_1^{\infty} \frac{dx}{\sqrt[4]{x^5}}$$

$$28. \int_0^{\infty} \frac{x}{1+x^2} dx$$

$$29. \int_0^2 \frac{dx}{\sqrt[3]{(x-1)^2}}$$

$$30. \int_3^{\infty} \frac{dx}{x^2 - 4}$$

Differensial tenglamalar va ehtimolga oid misollar

1. $(1+x^2)dy+(1+y^2)dx=0$ defferensial tenglamani yeching.
2. Bir jinsli differensial tenglamani yeching. $(y - \sqrt{x^2 + y^2})dx - xdy = 0$
3. Bir jinsli differensial tenglamani yeching. $(x^2 + xy + y^2)dx - x^2dy = 0$
4. $(3x^2 + 6xy^2)dx + (6x^2y + 4y^3)dy = 0$. to'liq defferensial tenglamani yeching.
5. $y^{IV} - 4y^{III} + 3y^{II} = 0$ differensial tenglamani yeching.

6. O'zgarmas koeffitsientli differensial tenglamani yeching:

$$y'' + 10y' + 9y = 3x - 4$$

7. O'zgarmas koeffitsientli differensial tenglamani yeching:

$$y'' + 5y' + 4y = 7x + 1.$$

9. Yashikda 10 ta mahsulot bo'lib, shulardan 8 tasi oliy sifatli. Tasodifiy ravishda 2 ta mahsulot olindi. Olingan mahsulotlarni hammasini oliy sifatli bo'lish ehtimoli topilsin

10. Guruhdagi yigirmata talabadan anjumanga yuborish uchun uchtasini tanlash kerak. Tanlashning nechta usuli mavjud?

11. "DADA" so'zida harflarning o'rnini almashtirish orqali nechta har xil so'z tuzish mumkin?

12. Qutida 3 ta qizil, 7 ta ko'k va 5 ta oq shar bor. Qutidan tavakkaliga olingan sharning: 1) oq rangda bo'lishi ehtimolini toping; 2) qizil rangda bo'lishi ehtimolini toping; 3) yashil rangda bo'lishi ehtimolini toping; 4) rangli bo'lishi ehtimolini toping

Mustaqil ta'lim mavzulari yuzasidan savollar:

1. Aniq integral yordamida aylana uzunligini hisoblash formulasini keltirib chiqaring
2. Ikki o'zgaruvchili funksiya va uning xossalari (Ikki o'zgaruvchili funksiya ta'rifi, aniqlanish va qiymatlar sohasi)
3. Ikki o'zgaruvchili funksiyaning limiti va uzluksizligi (Ikki o'zgaruvchili funksiya, limit, uzluksizlik)
4. Ikki o'zgaruvchili funksiyaning xususiy hosilalari (*hosila, xususiy hosila*)
5. Ikki o'zgaruvchili funksiyaning aralash hosilalari (*hosila, aralash hosila*)
6. Ishora almashuvchi qatorlar va ularning yaqinlashuvchanligi.
7. Qator yaqinlashishining zaruriy va yetarli alomati (*sonli qatorlar, Koshi kriteriyasi*)
8. Yaqinlashuvchi sonli qatorlar (*sonli qatorlar, yaqinlashuvchi sonli qatorlar, yaqinlashuvchi sonli qatorlarning yig'indisi*)
9. Hosilaga nisbatan yechilgan bir jinsli differensial tenglamalar va ularni yechish.

10. O'zgaruvchilari ajraladigan differensial tenglamalar va ularni o'zgaruvchilari ajralgan differensial tenglamalarga keltirish.
11. Ikkinchi tartibli chiziqli bir jinsli o'zgarmas koeffitsiyentli differensial tenglamalar.
12. Bir jinsli differensial tenglamalar (*bir jinsli funksiya, bir jinsli differensial tenglama*)
13. Yuqori tartibli chiziqli bir jinsli o'zgarmas koeffitsiyentli differensial tenglamalar.
14. Ehtimollarni ko'paytirish teoremasi (*ehtimollarni ko'paytirish teoremalari*)
15. Ehtimolning statistik va geometrik ta'riflari (*ehtimolning statistik va geometrik ta'rif*)
16. Hodisalarning yig'indisi va ko'paytmasi.
17. Bernulli sxemasi. Bernulli formulasi (*Bernulli sxemasi, Bernulli teoremasi*).
18. Uzlaksiz tasodifiy miqdorlar (*xossalari, tasodifiy miqdorlar, matematik kutilma, dispersiya*)
19. Uzlaksiz tasodifiy miqdorlarning zishlik funksiyasi va xossalari (*zichlik funksiya, xossalari*).
20. Variatsion qator uchun poligon va gistogramma (*polygon, gistogramma*)
21. Chiziqli regressiya tenglamasi.
22. Egri chiziqli regressiya tenglamasi.

Qatorning yaqinlashishini Dalamber, Koshi yoki taqqoslash alomatlarini yordamida aniqlash.

$$1. \sum_{n=1}^{\infty} \frac{1}{n^2}$$

$$2. \sum_{n=1}^{\infty} \frac{1}{n} \text{ (uzoqlashuvchi)}$$

$$3. \sum_{n=1}^{\infty} \frac{1}{2^n}$$

$$4. \sum_{n=1}^{\infty} \left(\frac{1}{3}\right)^n$$

$$5. \sum_{n=1}^{\infty} \frac{1}{n!}$$

$$6. \sum_{n=1}^{\infty} \frac{n}{2^n}$$

$$7. \sum_{n=1}^{\infty} \frac{1}{n^3}$$

$$8. \sum_{n=1}^{\infty} \frac{1}{\sqrt{n}} \text{ (uzoqlashuvchi)}$$

$$9. \sum_{n=1}^{\infty} \frac{2n-1}{n^2+1} \text{ (uzoqlashuvchi)}$$

$$10. \sum_{n=1}^{\infty} \frac{1}{n(n+1)}$$

$$11. \sum_{n=1}^{\infty} \frac{3^n}{n!}$$

$$12. \sum_{n=1}^{\infty} \frac{n^2}{2^n}$$

$$13. \sum_{n=1}^{\infty} \frac{1}{10^n}$$

$$14. \sum_{n=1}^{\infty} \frac{(-1)^n}{n} \text{ (shartli yaqinlashuvchi)}$$

$$15. \sum_{n=1}^{\infty} \frac{(-1)^n}{n^2} \text{ (absolyut yaqinlashuvchi)}$$

$$16. \sum_{n=1}^{\infty} \frac{n+1}{3n+2} \text{ (uzoqlashuvchi)}$$

$$17. \sum_{n=1}^{\infty} \left(\frac{n}{2n+1} \right)^n$$

$$18. \sum_{n=1}^{\infty} \frac{1}{n^2+5}$$

$$19. \sum_{n=1}^{\infty} \frac{2^n}{n^n}$$

$$20. \sum_{n=1}^{\infty} \frac{1}{\sqrt{n^3+1}}$$

$$21. \sum_{n=1}^{\infty} \frac{\sin^2 n}{n^2}$$

$$22. \sum_{n=1}^{\infty} \frac{1}{3n-1} \text{ (uzoqlashuvchi)}$$

$$23. \sum_{n=1}^{\infty} \frac{n!}{n^n}$$

$$24. \sum_{n=1}^{\infty} \frac{e^n}{n!}$$

$$25. \sum_{n=1}^{\infty} \frac{1}{\ln(n+1)} \text{ (uzoqlashuvchi)}$$

$$26. \sum_{n=1}^{\infty} \frac{1}{n \cdot 2^n}$$

$$27. \sum_{n=1}^{\infty} \frac{n^3}{e^n}$$

$$28. \sum_{n=1}^{\infty} \frac{\arctan n}{n^2 + 1}$$

$$29. \sum_{n=1}^{\infty} \frac{5^n}{n \cdot 3^n} \text{ (uzoqlashuvchi)}$$

$$30. \sum_{n=1}^{\infty} \frac{1}{(2n-1)!!}$$

Ikki o'zgaruvchili funksiyalardan x va y bo'yicha birinchi tartibli xususiy hosilalarni topish.

$$1. \quad z = x^2 + y^2$$

$$2. \quad z = x^3 - 3xy + y^3$$

$$3. \quad z = 5x^2y - 2y^3$$

$$4. \quad z = \sin(x + y)$$

$$5. \quad z = \cos(xy)$$

$$6. \quad z = e^{x+y}$$

$$7. \quad z = e^{xy}$$

$$8. \quad z = \ln(x^2 + y^2)$$

$$9. \quad z = \frac{x}{y}$$

$$10. z = \sqrt{x^2 + y^2}$$

$$11. z = x^y$$

$$12. z = \arctan(x/y)$$

$$13. z = \sin x \cdot \cos y$$

$$14. z = x^4 + y^4 - 4x^2y^2$$

$$15. z = \ln(x + 2y)$$

$$16. z = \sqrt{xy}$$

$$17. z = e^{x^2+y^2}$$

$$18. z = \frac{y}{x^2}$$

$$19. z = \sin(x^2y)$$

$$20. z = x^2 \sin y$$

$$21. z = y^2 \cos x$$

$$22. z = \ln(\sin x + y)$$

$$23. z = \frac{x+y}{x-y}$$

$$24. z = e^{-x} \sin y$$

$$25. z = \sqrt{1-x^2-y^2}$$

$$26. z = \arctan(x+y)$$

$$27. z = x \ln y$$

$$28. z = y \ln x$$

$$29. z = \cos(3x-2y)$$

$$30. z = x^3y + y^3x$$

Differensial tenglamalar va ehtimolga oid misollar

$$1. \text{ Bir jinsli differensial tenglamani yeching. } 2x^3y' = y(2x^2 - y^2)$$

$$2. y' + 2y = 3x + 5 \text{ tenglamaning umumiy toping}$$

$$3. xy' = \sqrt{x^2 - y^2} + y \text{ differensial tenglamani yeching.}$$

$$4. \text{ Bir jinsli differensial tenglamani yeching. } xydx + (y^2 + x^2)dy = 0$$

5. O'zgaruvchilari ajraladigan differensial tenglamani yeching. $(y + \sqrt{xy})dx = xdy$
6. $xy' + 2y = x^2$ differensial tenglamani yeching .
7. $e^y dx + (xe^y - 2y)dy = 0$. to'liq defferensial tenglamani yeching.
8. $(3x^2 - 2x - y)dx + (2y - x + 3y^2)dy = 0$. to'liq defferensial tenglamani yeching.
9. Bir jinsli differensial tenglamani yeching. $y(x + y)dx - x(2x + y)dy = 0$
- 10.Oltita bir xil varaqqa 3,3,4,5,5,5 sonlari yozilgan. Bu varaqlar ketma-ket joylashtirilsa, nechta olti xonali son tuzish mumkin?
- 11.Qutida 2 ta oq va 3 ta qora shar bor. Ikkita talaba qutidan navbati bilan bittadan shar oladi va qutiga qaytaradi. Birinchi bo'lib oq sharni olgan talaba yutuqqa ega bo'ladi. Birinchi talabaning yutuqqa ega bo'lishi ehtimolini toping.